IN THE CLAIMS:

1. A quadrature amplitude modulation demodulator comprising a timing synchroniser for resampling an incoming sampled quadrature amplitude modulated signal and a controller for controlling said timing synchroniser, said timing synchroniser having an acquisition mode in which said incoming signal is resampled with a sampling period which sweeps between first upper and lower limit values at a plurality of different sweep rates, said controller being arranged to initiate an acquisition cycle at a highest of said sweep rates, to reduce a sweep rate monotonically and to switch said timing synchroniser to a tracking mode if a timing error is below a first threshold.

2. A demodulator as claimed in claim 1, in which said controller is arranged, in said acquisition mode, to repeat each of said sweep rates a first predetermined number of times before selecting a next of said sweep rates.

3. A demodulator as claimed in claim 1, in which said controller is arranged, in said acquisition mode, to repeat said acquisition cycle a second predetermined number of times.

4. A demodulator as claimed in claim 1, in which said controller is arranged to institute a shift in a frequency band of said incoming signal if said timing error remains above said first threshold after said acquisition cycle and to initiate a further acquisition cycle.

5. A demodulator as claimed in claim 1, comprising an adaptive multipath equaliser connected to said timing synchroniser, said controller being arranged to disable adaption of said equaliser until said timing error falls below said first threshold.

6. A demodulator as claimed in claim 5, in which said controller is arranged to initiate another acquisition cycle of said timing synchroniser if said equaliser is unable to complete adaption in a predetermined time period.

7 A demodulator as claimed in claim 1, comprising a carrier synchroniser for locking a phase of a locally generated signal to a carrier of said incoming signal

8 A demodulator as claimed in claim 5, comprising a carrier synchroniser for locking a phase of a locally generated signal to a courier of said incoming signal and in which said controller is arranged to disable said carrier synchroniser until said equaliser has completed adaption.

Sub A2

9 A demodulator as claimed in claim 7, in which said carrier synchroniser has an acquisition mode in which a frequency of a locally generated signal sweeps between second upper and lower limited values at a plurality of different sweep rates, said controller being arranged to initiate a carrier acquisition cycle at a highest of said sweep rates, to reduce a sweep rate monotonically and to switch said carrier synchroniser to a tracking mode if a carrier synchronisation error is below a second threshold.

10. A demodulator as claimed in claim 9, in which said controller is arranged, in said carrier synchroniser acquisition mode, to repeat each of said sweep rates a third predetermined number of times before selecting a next of said sweep rates.

11. A demodulator as claimed in claims 9, in which said controller is arranged, in said carrier synchroniser acquisition mode, to repeat said carrier acquisition cycle a fourth predetermined number of times.

12. A demodulator as claimed in claim 9, in which said controller is arranged to return said carrier synchroniser to said acquisition mode if a mean square error of demodulated symbols remains above a third threshold for a predetermined time period.

Sub A3

13 A quadrature amplitude demodulator comprising a carrier synchroniser for locking a phase of a locally generated signal to a carrier of an incoming signal and a controller for controlling said carrier synchroniser, said carrier synchroniser having an acquisition mode in which a frequency of a locally generated signal sweeps between second upper and lower limit values at a plurality of different sweep rates, said

controller being arranged to initiate a carrier acquisition cycle at a highest of said sweep rates, to reduce a sweep rate monotonically and to switch said carrier synchroniser to a tracking mode if a carrier synchronisation error is below a second threshold.

Sub #3 cont.

14 A demodulator as claimed in claim 13, in which said controller is arranged, in said acquisition mode, to repeat each of said sweep rates a third predetermined number of times before selecting a next of said sweep rates.

15 A demodulator as claimed in claims 13, in which said controller is arranged, in said acquisition mode, to repeat said carrier acquisition cycle a fourth predetermined number of times.

16 A demodulator as claimed in claim 13, in which said controller is arranged to return said carrier synchroniser to said acquisition mode if a mean square error of demodulated symbols remains above a third threshold for a predetermined time period.

17 A receiver comprising a quadrature amplitude modulation demodulator comprising a timing synchroniser for resampling an incoming sampled quadrature amplitude modulated signal and a controller for controlling said timing synchroniser, said timing synchroniser having an acquisition mode in which said incoming signal is resampled with a sampling period which sweeps between first upper and lower limit values at a plurality of different sweep rates, said controller being arranged to initiate an acquisition cycle at a highest of said sweep rates, to reduce a sweep rate monotonically and to switch said timing synchroniser to a tracking mode if a timing error is below a first threshold.

18 A receiver comprising a quadrature amplitude demodulator comprising a carrier synchroniser for locking a phase of a locally generated signal to a carrier of an incoming signal and a controller for controlling said carrier synchroniser, said carrier synchroniser having an acquisition mode in which a frequency of a locally generated signal sweeps between second upper and lower limit values at a plurality of different sweep rates, said controller being arranged to initiate a carrier acquisition cycle at a highest of said sweep

rates, to reduce a sweep rate monotonically and to switch said carrier synchroniser to a tracking mode if a carrier synchronisation error is below a second threshold.